



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/686,519	10/16/2003	Vladimir Kochergin	340-81	4899

23117 7590 08/10/2004

NIXON & VANDERHYE, PC
1100 N GLEBE ROAD
8TH FLOOR
ARLINGTON, VA 22201-4714

EXAMINER

VALENTINE, DONALD R

ART UNIT	PAPER NUMBER
----------	--------------

1742

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/686,519

Applicant(s)

KOCHERGIN ET AL.

Examiner

Donald R. Valentine

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) 43-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-8 and 10-25 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 9 and 26-42 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 03/22/04; 07/15/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C.

121:

- I. Claims 1-42, drawn to a method of electrochemical etching, classified in class 205, subclass 640.
- II. Claims 43-50, drawn to a method of etching, classified in class 216, subclass 24.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions have different modes of operation. One method uses electrochemical etching and the other uses generic etching methods.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification and recognized divergent subject matter, and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

This application further contains claims directed to the following patentably distinct species of the claimed invention:

Group I

Art Unit: 1742

Species A, electrochemical etching

Species B, chemical etching

Species C, reactive ion etching

Species D, ion milling

Group II

Species A, alkaline etching

Species B, acidic etching

Group III (deposition of chemically different layer)

Species A, thermal oxidation

Species B, chemical vapor deposition

Species C, wet chemical oxidation

Species D, physical vapor deposition

Group IV (chemically different layer)

Species A, silicon oxide

Species B, silicon nitride

Group V (substrate material)

Species A, zinc compounds and alloys

Species B, cadmium compounds and alloys

Species C, mercury compounds and alloys

Species D, carbon compounds

Species E, silicon compounds

Species F, germanium compounds

Species G, tin compounds and alloys

Art Unit: 1742

Species H, lead compounds and alloys

Species I, aluminum compounds and alloys

Species J, gallium compounds and alloys

Species K, indium compounds and alloys

Species L, bismuth compounds and alloys

Species M nitrogen compounds

Species N, oxygen compounds

Species O, phosphorus compounds

Species P, arsenic compounds

Species Q, antimony compounds

Species R, sulfur compounds

Species S, selenium compounds

Species T, tellurium compounds

Group VI (deposited material)

Species A, transparent material

Species B, reflective material

Species C, absorptive material

Species D, absorptive and reflective material

Group VII (deposition method for material)

Species A, chemical vapor deposition

Species B, atomic layer deposition

Species C, photochemical decomposition

Species D, thermal oxidation

Art Unit: 1742

Species E, electroplating

Species F, electroless plating

Species G, die-casting

Species H, molding

Group VIII (removal of unwanted remainder)

Species A, reactive ion etching

Species B, chemical etching

Species C, grinding

Species D, mechanical polishing

Species E, chemical polishing

Species F, chemical and mechanical polishing

Group IX (antireflective structure deposition)

Species A, thermal oxidation

Species B, chemical vapor deposition

Species C, physical vapor deposition

Species D, thermal evaporation

Species E, physical vapor deposition and thermal evaporation

Group X (sealing method)

Species A, anodic bonding

Species B, thermal bonding

Species C, glass frit bonding

Species D, brazing

Species E, adhesive bonding

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for each Group listed above for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable.

Currently, claim 1 is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

During a telephone conversation between Robert Faris and Examiner Roberts P. Culbert on 7/14/04 a provisional election was made with traverse to

Art Unit: 1742

prosecute the invention of Group I, Claims 1-42, and the following species:

Group I, Species A (electrochemical etching); Group II, Species A (alkaline etching); Group III, Species D (physical vapor deposition); Group IV, Species A (silicon oxide); Group V, Species E (silicon compounds); Group VI, Species D (absorptive and reflective material); Group VII, Species A (chemical vapor deposition); Group VIII, Species B (chemical etching); Group IX, Species C (physical vapor deposition) and Group X, Species E (adhesive bonding).

Affirmation of this election must be made by applicant in replying to this Office action. Claims 43-50 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 6-9 and 12-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites the limitation "surface topology" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 7 recites the limitation "in the oxygen-contained atmosphere" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation "electrochemical etching" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

Art Unit: 1742

3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
6. Claims 1-3, 6-8, 10-14, 19-21 and 24-25 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lehmann et al.

Lehmann et al show a method in which a single crystal semiconductor wafer substrate is etched to produce a structured layer with pores with depths partially there through and having modified cross-sections (col. 2, lines 11-30) at least over part of the depth. (See col. 1, lines 35-54). Figure 1 shows a regularly arranged array of depressions in the first surface. (Applicant's claim 2). The substrate is defined as having a first surface, however, the presence of a second surface is inherent to the substrate structure.

As for claim 3, a photo resist mask is recited. (Col.3, lines 15-21); As for claim 6, surface topology is recited (col. 4, lines 51-60). For claim 8, silicon nitride is described at (col. 2, lines 45-46). Claim 11, recites a silicon (100)-oriented wafer, which is shown in the reference at col. 2, lines 1-3. Claims 12-14, a fluoride-containing acidic electrolyte is shown at col. 4, lines 7-20. And for claim 19, the silicon wafer is n-type doped, etching is electrochemical and illumination occurs at the back side of the substrate, the above mentioned "second side" of the wafer, Col. 4, lines 16-26.

The reference does not refer to spectral filters but does mention filters per se of which spectral filters may be considered generic.

The reference does not recite providing etching starting points on the first surface.

If not shown by the reference, then the claims would be considered an obvious modification thereover because the depressions in the top surface of the wafer are obvious "etching starting points" because the initial point of etching begins at the point of the depressions and progresses down through the thickness of the wafer to produce holes and modified cross-sections of the holes.

Allowable Subject Matter

7. Claims 4-5, 9, 26-42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 15-18, 22-23 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Burrus, Jr. shows photoetching slots in a semiconductor.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donald R. Valentine whose telephone number is 571-272-1250. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax

Art Unit: 1742

phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Donald R. Valentine
Primary Examiner
Art Unit 1742

drv
August 6, 2004